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ELECTRONICS TECHNICIAN

EXAMINATION

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By Saroftus.

Part I--- Magnetic effects

Multiple choice--Circle the most correct answer.

1. A temporary magnet maintains its magnetic properties only as long as it is in a magnetic field and is made of:
    - a. hard steel.
    - C [✓ b.] soft iron.
    - c. aluminum.
    - d. copper

2. Which two of the following answers have no bearing on the magnetic polarity of an electromagnet?:
    - a. Direction of current through the coil. ✓
    - C [✓ b.] Direction of the permeability of the core. ✓
    - c. Direction in which the turns of the coil are wound. ✓
    - [✓ d.] Magnetomotive force developed by the electromagnet.

3. A winding of a transformer has 5000 turns. The current through the winding is 68 ma. The ampere turns rating of this winding is:
    - [✓ a.] 340,000.
    - [✓ b.] 340.
    - c. 5000.
    - d. 68.

✓

5000
.068
340,000

NI

4. If the ampere-turns of a coil are increased:
    - a. the reluctance of the magnetic path will increase greatly.
    - b. the magnetmotive force generated will be decreased.
    - C [✓ c.] the lines of force about the coil will be increased.
    - d. the magnetic field about the coil will be decreased.

5. The ratio of the magnetic conducting ability of a material, as compared to air, is called:
    - C [✓ a.] the permeability of the material.
    - b. the reluctance of the material.
    - c. the magnetization of the material.

. The number of magnetic lines of force per given unit of cross-sectional area of a magnetic field is called:
    - C [✓ a.] Flux density, the unit being the gauss.
    - b. Magnetmotive force, the unit being the ohm.
    - c. Hystersis, the unit being the history.

7. If the rate at which a conductor is passed through a magnetic field, and cuts the lines of force, is increased, the e.m.f. induced in the conductor will:
    - a. remain the same.
    - C [✓ b.] increase.
    - c. decrease.

Examination--Part I--Magnetic Effects

To induce an appreciable e.m.f. in a conductor, the conductor must pass through the magnetic field:
[✓ a.] at an angle to the lines of force.
b. parallel to the lines of force.
C c. in any direction, because direction has no bearing whatsoever on induced e.m.f.

9. Two coil are connected in a series-opposing circuit. One coil has an inductance of 800mh; and the other, 700mh. If the mutual inductance between the coils is 600mh, the total inductance is:
a. 2.7 h.
b. 900 mh.
C c. 2.1 mh.
[✓ d.] 300 mh. ✓

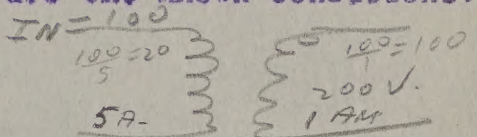
$L_1 + L_2 - 2M$
$800 + 700 - 1200 = 300$

10. The property exhibited by two coil which are linked by the lines of flux produced by alternating current flow in one of the coils is expressed as:
a. flux leakage.
b. coefficient of coupling.
C c. self inductance.
[✓ d.] mutual inductance. ✓

11. Currents set up within the core of a transformer, due to the magnetic field, are known as:
a. copper loss.
C [✓ b.] eddy currents.
c. magnetizing currents.
d. hystersis.

12. A magnetic field of low-frequency variations is to be confined to a small area surrounding the inductor producing the field. The inductor can be enclosed in a shield composed of material which has:
[✓ a.] low reluctance.
✓ [✓ b.] low permeability.
c. low d-c resistance.
d. high dielectric constant.

For a transformer of 100% efficiency the following are the known conditions:
1. Ampere-turns equals 100.
2. Primary current equals 5 amperes.
3. Secondary current equals 1 ampere.
4. Secondary voltage equals 200 volts.



Solve the following:

C 13. Primary voltage. $\frac{E_p}{N_p} = \frac{E_s}{N_s} = \frac{E_p}{20} = \frac{200}{100} = \frac{200 \times 20}{100} = \boxed{40\ V}$

C 14. Primary turns. $= 100 \div 5 = \boxed{20}$

C 15. Secondary turns. $= 100 \div 1 = \boxed{100}$

C 16. Primary and secondary power. $P = EI =$ PRIMARY $40 \times 5 = 200$ W.
SECOND. $200 \times 1 = 200$ W